Aerosol-cloud-turbulence interactions in well-coupled Arctic boundary layers over open water (164)
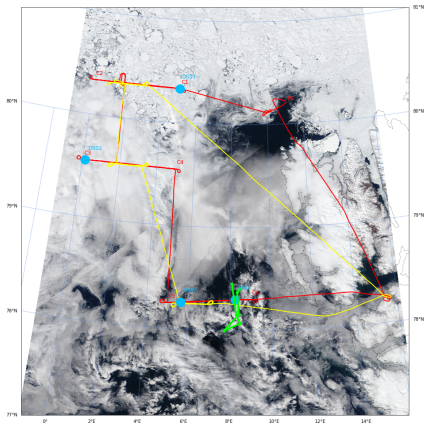
Jan Chylik, Roel Neggers

Institute for Geophysics and Meteorology, University of Cologne

Improvement and calibration of clouds in models, Toulouse 2021

Jan Chylik, Roel Neggers
Institute for Geophysics and Meteorology, University of Cologne
Faculty of Mathematics and Natural Sciences

University of Cologne

Arctic Clouds

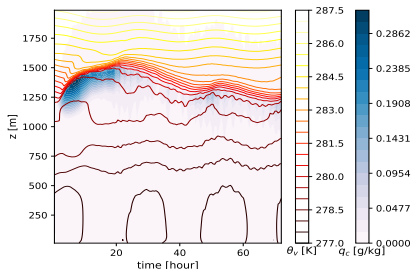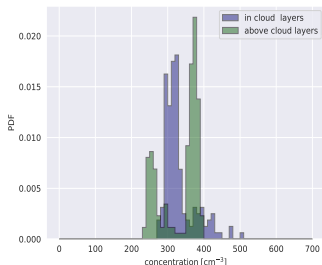Collocated flights took place during the ACLOUD campaign on 18 June 2017 over the Fram Strait

Investigating the **aerosol-cloud-turbulence** interaction with the help of **high-resolution LES constrained by observations** to investigate the evolution of mixed-phase clouds.

Our model study focuses on **Spring-time** convective clouds, which are particularly sensitive to aerosol concentrations and the size of ice particles.

Jan Chylik, Roel Neggers
Institute for Geophysics and Meteorology, University of Cologne   University of Cologne
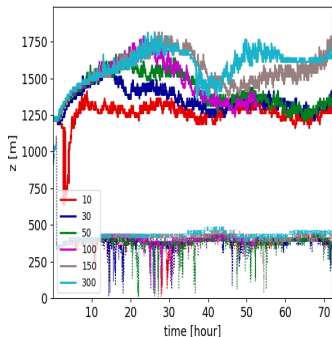Faculty of Mathematics and Natural Sciences

LES Study

fine-scale simulation in Dutch Atmospheric Large-Eddy Simulation (DALES), demi-Lagrangian frame of reference

- initial conditions and large scale forcing based on short-range forecast and dropsonde observations
- full 2-moment bulk scheme of **Seifert & Beheng**
- CCN concentrations based on aerosol observations from Ultra-High Sensitivity Aerosol Spectrometers (UHSAS)


(The manuscript on the case setup is currently in preparation.)

Jan Chylik, Roel Neggers
Institute for Geophysics and Meteorology, University of Cologne   University of Cologne
Faculty of Mathematics and Natural Sciences

Impact of CCN Concetrations

Changes in the CCN concentration impact the height of liquid cloud layer (as well as the liquid water path and ice water path).
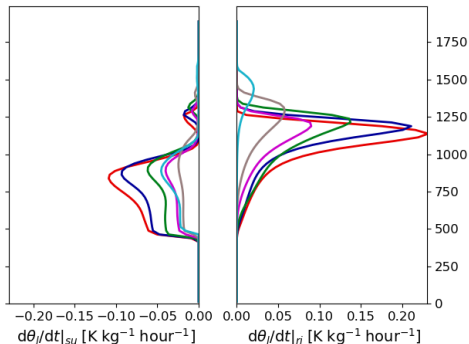
The buoyancy in the mixed layer is modified by heat release during riming (middle) and consumption of heat due to sublimation of ice hydrometeors (right).

Jan Chylik, Roel Neggers
Institute for Geophysics and Meteorology, University of Cologne
Faculty of Mathematics and Natural Sciences

University of Cologne